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| 10/815,907 | 03/31/2004 | Brian Lee Lawrence | 139955 | 9290 |

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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NISKAYUNA, NY 12309

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| EXAMINER |
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VAN ROY, TOD THOMAS

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| ART UNIT | PAPER NUMBER |
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2828

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| NOTIFICATION DATE | DELIVERY MODE |
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01/17/2008

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

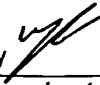
Application No.

10/815,907

Applicant(s)

LAWRENCE ET AL.

Examiner

Tod T. Van Roy 

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 November 2007.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6, 8-15 and 23-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 12, 13, 26 and 27 is/are allowed.
- 6) ☒ Claim(s) 1-6, 8-11, 14, 15, 23-25 and 28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 11/06/2007 has been entered.

Response to Amendment

The Examiner acknowledges the amending of claims 1, 12, 23, and 26.

Response to Arguments

Applicant's arguments with respect to claims 1 and 23 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.

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2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-6, 8-15, 23-25, and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Baer et al. (US 4701929) in view of Baer (US 5627849), Matsumoto et al. (US 6295305), and further in view of Rowe (US 5260953).

With respect to claims 1, 6, and 11, Baer 929' teaches an apparatus comprising: a laser cavity, and disposed within the laser cavity at least three mirrors (fig.5 #39/56/58), at least one filter (fig.5 #52 etalon), and a plurality of crystals (fig.5 #11/16), wherein said at least three mirrors are substantially arranged in a folded linear configuration, at least one of said plurality of crystals comprises a doped lasing crystal (fig.5 #11 Nd), and at least one of said plurality of crystals comprises a nonlinear crystal (fig.5 #16), wherein said at least three mirrors, said at least one filter, and said plurality of crystals are configured for providing electromagnetic radiation of a single frequency (col.8 lines 1-2); at least one electromagnetic radiation source being coupled into the laser cavity (fig.5 pump beam), wherein said at least one electromagnetic radiation source is capable of providing electromagnetic radiation having a particular wavelength (inherent) to said laser cavity, wherein at least one of said plurality of crystals is configured to, in operation, alter one or more properties of said electromagnetic radiation provided by said electromagnetic radiation source (1/2 the wavelength, abs.). Baer 929' teaches the laser crystal to be Nd based, but not to be of the Colquiriite type. Baer 929' additionally does not teach the use of a tunable birefringent filter, or folded lambda cavity configuration. Matsumoto teaches a harmonic generating laser

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system comprising a multi-mirror cavity, birefringent filter, etalon, nonlinear crystal, and a Coloquiriite laser crystal (fig.1). Rowe teaches a SHG (second harmonic generating) system in which a tunable Quartz birefringent filter and etalon are used. Baer 849' teaches a lambda cavity configuration (fig.5). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and laser crystal of Rowe with the Cr Coloquiriite laser crystal of Matsumoto in order to select a different output wavelength for the system by adjusting the lasing material, as well as to use the filter and etalon of Rowe in order to allow for polarization control and the ability to tune the output wavelength, and the lambda mirror configuration of Baer 849' in order to increase the frequency doubled output power (Baer 849' col.7 lines 36-40).

With respect to claims 2 and 9, Baer, Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, but Baer 929' does not teach the pumping source to be a 670nm emitting laser diode. Matsumoto teaches the use of a 670nm emitting laser diode as the pumping source for the Coloquiriite laser crystal (col.6 lines 8-11). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the Coloquiriite laser crystal system of Baer, Rowe and Matsumoto with the diode laser and pumping wavelength of Matsumoto in order to take advantage of the pumping frequency band to which the gain of the lasant crystal would be maximized.

With respect to claims 3 and 8, Baer 929', Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Baer 849' further teaches the nonlinear crystal to be of the LBO type (col.5 line 36). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the nonlinear crystal of Baer 929' with the

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type of Baer 849' in order to output a different wavelength range. (The lasing range of the Coloquiriite laser crystal of Baer, Rowe and Matsumoto (taught to be 780-1000nm, Matsumoto col.1 lines 27-28) combined with the present LBO crystal type of Baer would then output light in the blue frequency range (~390-500nm, Matsumoto col.1 lines 28-32).)

With respect to claims 4-5, Baer, Rowe and Matsumoto further teach the input light from the pumping source has its wavelength altered by one of the plurality of crystals (pumping light is converted to the output wavelength of the Coloquiriite laser crystal).

With respect to claim 10, Baer 929', Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Baer 849' further teaches a cavity mirror of the lambda system to have a reflective dielectric coating (col.7 lines 36-41)

With respect to claim 14, Baer 929', Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Rowe further teaches the radiation passing through the combined filter to be altered by approximately fractions of a nanometer (col.5 lines 13-17, specific tuning on a per wavelength basis would necessitate accuracy of approximately fractions of a nanometer).

With respect to claim 15, Baer 929', Rowe and Matsumoto teach the laser outlined in the rejection to claim 1, and Rowe further teaches the apparatus can be incorporated within a holographic data recording system, said holographic recording system comprising one or more photosensitive recording mediums (fig.1 #40), said laser source being configured to in operation: provide one or more laser beams to said

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photosensitive recording mediums (fig.1 #38 to #40), and form an image in said recording medium (image would inherently form in the CCD device). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the recording system of Rowe with the apparatus of Baer in order to record desired data.

Claim 23 is rejected for the same reasons outlined in the rejection to claim 1 above.

Claim 24 is rejected for the same reasons outlined in the rejection to claim 8 above.

Claim 25 is rejected for the same reasons outlined in the rejection to claim 3 above.

Claim 28 is rejected for the same reasons outlined in the rejection to claim 15 above.

Allowable Subject Matter

Claims 12-13 and 26-27 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Claims 12 and 26 are believed to be allowable as a tunable laser system outlined in the rejections to claims 11 and 24 above wherein 3 plates of quartz birefringent material is used to form the filter is not believed to be obvious in view of the prior art. The tunable system including all elements outlined in these claims, as well as the ability of the filter to be adjusted via orientation and tune the wavelength (Rowe, col.5 lines 17-

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20) are known, the addition to this system of the disclosed adjustable quartz birefringent filter to comprise at least 3 plates was found to be a non-obvious combination in view of the prior art.

Claims 13 and 27 are allowable as they depend from allowable claims 12 and 26.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR

